

**PATENT**

**MS167381.01/MSFTP197US**

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Date: September 28, 2007

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of:

Applicant(s): Sean E. Trowbridge

Serial No: 09/817,880

Filing Date: March 26, 2001

Examiner: James D. Rutten

Art Unit: 2192

Title: SYSTEM AND METHOD FOR PROVIDING ON-DEMAND GENERATION OF  
SPECIALIZED EXECUTABLES

**Mail Stop Appeal Brief-Patents  
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P.O. Box 1450  
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**REPLY BRIEF**

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Dear Sir:

Applicants' representative submits this Reply Brief in response to the Examiner's Answer dated July 31, 2007. In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP197US].

**REMARKS**

Claims 1-33 are currently pending and are presently under consideration. Favorable reconsideration of the subject patent application is respectfully requested in view of the comments herein. In particular, the following comments address deficiencies contended in the Examiner's Answer to applicants' Appeal Brief.

**I. Regarding the Rejection of Claims 1, 2, 5-17 and 19 Under 35 U.S.C §103(a)**

The Examiner incorrectly maintains the rejection of claims 1, 2, 5-17 and 19 under 35 U.S.C. §103(a) as being unpatentable over prior art of record Breslau *et al.* (U.S. 5,761,512) in view of Spyker *et al.* (U.S. 6,571,389), Armstrong ("Hotspot: A new breed of virtual machine"), and Knight (U.S. 6, 126,330). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight, alone or in combination, do not teach or suggest each and every limitation of applicant's claimed invention.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The subject invention relates to creating and loading an appropriate executable image at run time in a virtual execution environment based upon attributes associated with the operating environment and user of the virtual execution environment. For example, the attributes can related to a specific user that is running applications in the operating environment, thus allowing for the subject invention to create one or more executable images that are optimized for the user's current needs. Independent claim 1 (and similarly independent claim 30) recites *a log to*

*store generic code image runtime information relating to the operating environment of the virtual subsystem, the runtime logged information includes at least a set of information related to a particular user to create a native executable according to the particular user, the logged information is employed as feedback to generate the native executable based upon the availability of the specialized image.*

Breslau *et al.*, Spyker *et al.*, and Armstrong fail to teach or suggest the aforementioned novel aspects of applicant's invention as recited in the subject claims. The Office Action asserts that Breslau *et al.* discloses logged information to create a native executable. However, the information disclosed in the cited art is a table that equates affinity values to runtime environments. This is not information that is logged during runtime execution of an executable image. The cited art does not disclose or suggest how this table is populated and specifically is silent regarding logging information during runtime execution of the compiled image as in applicant's claimed invention. Breslau *et al.* is concerned with creating a single set of code files that contains compile switches (affinity values) that will compile particular code classes for each specific hardware and operating system environment to create an executable image appropriate to the operating environment. Breslau is not concerned with creating a runtime image for a particular user. The Office Action incorrectly asserts that Spyker *et al.* discloses that a user can control the creation of a runtime image according to a particular user. On the contrary, the cited art does not disclose a user specific executable image. Rather, Spyker *et al.* discloses a system for instantiating an appropriate runtime environment for a particular Java application (or applet). Java applications and applets may rely on a particular version of a Java virtual machine (JVM) to execute. Many times the Java virtual machine on particular operating system or associated with a particular browser may be behind or ahead of the version required to execute the Java application. The cited art addresses this disparity by including a properties file in the Java archive file (JAR) associated with a particular Java application. The properties file identifies the particular JVM and other extensions required to execute the Java application. Using this file, the appropriate environment can be instantiated to execute the Java application. The cited art is silent regarding logging runtime information associated with a particular user or creating an executable image according to the particular user. The section of Spyker *et al.* cited in the Office Action merely states that when a user attempts to launch an application on a computer, the appropriate environment *for the application* is instantiated, *not* an appropriate environment *for a*

*particular user*. The Examiner's Reply states that the user controls creation of the executable image. On the contrary, the user merely initiates execution of an application and the appropriate environment is automatically instantiated for the application. The user has no control over the creation of the executable image. Spyker *et al.* also does not teach or suggest that information related to the user is logged during execution of the application. Moreover, Armstrong is also silent regarding logging runtime information related to a particular user to create an executable image according to the particular user. Armstrong discloses a Java just-in-time compiler to improve execution performance of Java applications. The cited art improves on Java bytecode, by monitoring execution times for methods and compiling those bytecode methods that are running slow into native machine code. No information related to a user is logged. Breslau *et al.*, Spyker *et al.*, and Armstrong do not suggest logging information for particular user or creating a native executable according to a particular user. Knight is cited to make up for these deficiencies of Breslau *et al.*, Spyker *et al.*, and Armstrong. However, Knight discloses a system where a developer creates an input file that is read in by an application to determine instrumentation points for the application. The Examiner's Reply cites a section of the reference that disclosing logging of user interactions with an application. However, this logging information is manually employed by a developer to create an input file. The developer manually selects logged information and enters the instrumentation point information. Knight is concerned with a monitoring tool for the purpose of making general enhancements to an application that is useful for all users of an application. The monitoring input file is not used to create a native executable image according to a particular user. The input file does not change the application, but merely identifies instrumentation points to monitor. The developer then can employ the information gathered by the instrumentation points to make general improvements to the application. Knight does not disclose a specialized executable image according to a particular user. In fact, all of the cited references are silent regarding creating an executable image that is specialized for a particular user. Therefore, Breslau *et al.*, Spyker *et al.*, Armstrong, Knight fail to teach or suggest a log to store generic code image runtime information relating to the operating environment of the virtual subsystem, the runtime logged information includes at least a set of information related to a particular user to create a native executable according to the particular user, the logged information is employed as feedback to generate the

native executable based upon the availability of the specialized image as in applicant's claimed invention.

Accordingly, applicant's representative respectfully submits that Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight, alone or in combination, fail to teach or suggest all limitations of applicant's invention as recited in independent claims 1 and 30 (and claims 2, 5-17, 19 and 31 that respectfully depend there from), and thus fails to make obvious the claimed invention. For that reason, reversal of this rejection is respectfully requested..

## **II. Regarding the Rejection of Claims 30 and 31 Under 35 U.S.C §103(a)**

The Examiner incorrectly maintains the rejection of claims 30 and 31 under 35 U.S.C. §103(a) as being unpatentable over prior art of record Breslau *et al.* (U.S. 5,761,512) in view of Spyker *et al.* (U.S. 6,571,389), Armstrong ("Hotspot: A new breed of virtual machine"), and Knight (U.S. 6, 126,330). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight, alone or in combination, do not teach or suggest each and every limitation of applicant's claimed invention. Independent claim 30 recites *a signal for communicating between one or more components of a virtual system, the virtual system processing a generic code image and logging information relating to an operating environment and a particular user of the virtual system via the signal, the logged information includes at least a set of information to create a specialized native executable according to the particular user; wherein the logged information is employed as feedback across the signal to generate a specialized native executable if the generic code image is determined incompatible with the operating environment of the virtual system, the specialized native executable is utilized to provide improved performance of the virtual system.* As discussed supra, with respect to the similar limitations of independent claim 1, Breslau *et al.*, Spyker *et al.*, Armstrong, Knight fail to teach or suggest logging information relating to an operating environment and a particular user of the virtual system via the signal, the logged information includes at least a set of information to create a specialized native executable according to the particular user.

Accordingly, applicant's representative respectfully submits that Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight, alone or in combination, fail to teach or suggest all limitations of applicant's invention as recited in independent claim 30 (and claim 31 that respectfully depend there from), and

thus fails to make obvious the claimed invention. Therefore, reversal of this rejection is respectfully requested.

### **III. Regarding the Rejection of Claims 3 and 4 Under 35 U.S.C. §103(a)**

The rejection of claims 3 and 4 have been incorrectly maintained by the Examiner under 35 U.S.C. §103(a) as being unpatentable over Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight as applied in the above rejection of claims 1, 2, 5-10, 12-17, 19, 30 and 31, and further in view of Fogarty *et al.* (U.S. 6,721,946). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Fogarty *et al.* does not make up for the aforementioned deficiencies noted above with respect to Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight regarding independent claim 1, from which the subject claims depend. The cited reference is related to manufacturing of build to order computers and assessing options configurations that are frequently purchased to produce static installation images. Fogarty *et al.* is silent regarding building executable images that are specialized according to particular user. Notably, Fogarty *et al.* fails to teach or suggest a system that contains *a log to store generic code image runtime information relating to the operating environment of the virtual subsystem, the runtime logged information includes at least a set of information related to a particular user to create a native executable according to the particular user, the logged information is employed as feedback to generate the native executable based upon the availability of the specialized image* as recited in claim 1. Therefore, Breslau *et al.*, Spyker *et al.*, Armstrong, Knight and Fogarty *et al.* fail to make obvious the subject claimed invention and it is respectfully submitted that this rejection be reversed.

### **IV. Regarding the Rejection of Claim 18 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claim 18 under 35 U.S.C. §103(a) as being unpatentable over Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight as applied in the above rejection of claims 1, 2, 5-10, 12-17, 19, 30 and 31, and further in view of Nelin *et al.* (U.S. 6,253,368). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Nelin *et al.* does not make up for the above noted deficiencies with respect to Breslau *et al.*, Spyker *et al.*, Armstrong, and Knight regarding amended independent claim 1, from which the subject claim depends. Nelin *et al.* discloses a system related to

dynamically debugging internet applications. Nelin *et al.* fails to teach or suggest a system that contains *a log to store generic code image runtime information relating to the operating environment of the virtual subsystem, the runtime logged information includes at least a set of information related to a particular user to create a native executable according to the particular user, the logged information is employed as feedback to generate the native executable based upon the availability of the specialized image* as recited in claim 1. Therefore, Breslau *et al.*, Spyker *et al.*, Armstrong, Knight and Nelin *et al.* fail to make obvious the subject claimed invention; and it is respectfully submitted that this rejection should be reversed.

**V. Regarding the Rejection of Claims 20-22 and 27-29 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claims 20-22 and 27-29 under 35 U.S.C. §103(a) as being unpatentable over Goodwin *et al.* (U.S. 6,158,049) in view of Knight (U.S. 6,126,330). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Goodwin *et al.* and Knight do not teach each and every element of applicant's invention as recited in the subject claims.

Independent claim 20 (and similarly independent claim 28) recites *generating runtime feedback associated with the first code image and a particular user to adjust a subsequent code image according to the runtime environment, the feedback includes at least a set of information to create a code image according to the particular user*. Goodwin *et al.* does not teach or suggest the aforementioned novel features of applicant's claimed invention as recited in the subject claims. Rather, Goodwin *et al.* discloses a system whereby code is inserted into an original image as "instrumentation" code and the original image plus the instrumentation code is run to determine a profile that can later be used to generate an optimized version of the original code. The cited art is concerned with automating the process of optimizing native machine code that is generated from high-level language compilers. Goodwin *et al.* is silent regarding any code image runtime feedback related to a particular user and also does not create a native executable image according to a particular user. Knight is cited to make up for these deficiencies of Goodwin *et al.* However, Knight discloses a system where a developer creates an input file that is read in by an application to determine instrumentation points for the application. This input file not used to create a code image according to a particular user. The input file does not change the application, but merely identifies instrumentation points to monitor. Therefore,

Goodwin *et al.* and Knight, alone or in combination, fail to teach or suggest generating runtime feedback associated with the first code image and a particular user to adjust a subsequent code image according to the runtime environment, the feedback includes at least a set of information to create a code image according to the particular user.

In view of at least the foregoing, applicant's representative respectfully submits that Goodwin *et al.* and Knight, alone or in combination, fail to teach or suggest all limitations of applicant's invention as recited in independent claims 20 and 28 (and claims 21, 22, 27 and 29 that respectfully depend there from), and thus fails to make obvious the subject claimed invention. Accordingly, reversal of this rejection is respectfully requested.

**VI. Regarding the Rejection of Claims 23 and 24 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claims 23 and 24 under 35 U.S.C. §103(a) as being unpatentable over Goodwin *et al.* and Knight as applied in the above rejection of claim 21, further in view of Aho *et al.* ("Compilers: Principles, Techniques, and Tools"). It is respectfully requested that this rejection be reversed for at least the following reasons. Aho *et al.* fails to make up for the deficiencies of Goodwin *et al.* and Knight as discussed *supra* with regards to the limitations recited in independent claim 20, from which the subject claims depend. Aho *et al.* describes general principles regarding interpreters, compilers and assembler. The cited art is silent regarding logging runtime information related to a particular user to create an executable image according to the particular user. Therefore, Goodwin *et al.*, Knight and Aho *et al.* fail to teach or suggest ***generating runtime feedback associated with the first code image and a particular user to adjust a subsequent code image according to the runtime environment, the feedback includes at least a set of information to create a code image according to the particular user.*** Therefore, reversal of this rejection is respectfully requested.

**VII. Regarding the Rejection of Claims 25 and 26 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claims 25 and 26 under 35 U.S.C. §103(a) as being unpatentable over Goodwin *et al.*, Knight, and Aho *et al.* as applied to the rejection of claim 23 above, and further in view of Breslau. As noted above with respect to independent claim 21 and claim 23 from which claims 25 and 26 depend, Goodwin *et al.*, Knight, and Aho *et al.* fail to teach or suggest ***generating runtime feedback associated with the***



*first code image and a particular user to adjust a subsequent code image according to the runtime environment, the feedback includes at least a set of information to create a code image according to the particular user.* Breslau *et al.* fails to make up for the deficiencies of Goodwin *et al.*, Knight, and Aho *et al.* with regards to this novel feature. As conceded by the Examiner, with respect to the similar limitation of independent claim 1, Breslau *et al.* fails to teach or suggest runtime feedback associated with a particular and creating a code image according to the particular user. Accordingly, reversal of this rejection is respectfully requested.

#### **VIII. Regarding the Rejection of Claim 32 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claim 32 under 35 U.S.C. §103(a) as being unpatentable over Breslau in view of Spyker, Knight, and Nelin. It is respectfully submitted that this rejection should be reversed for at least the following reasons. Breslau *et al.*, Spyker *et al.*, Knight and Nelin *et al.* are silent regarding *a set of information associated with a particular user that is logged during execution of a virtual system to create an executable image according to the particular user of the virtual system*, for the reasons discussed above with respect to the similar limitations of independent claims, 1, 20, 28 and 30. Accordingly, reversal of this rejection is respectfully requested.

#### **IX. Regarding the Rejection of Claim 33 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claim 33 under 35 U.S.C. §103(a) as being unpatentable over Breslau in view of Ramezani (U.S. 6,457,122), Knight, and Spyker. It is respectfully submitted that this rejection should be reversed for at least the following reasons. Breslau *et al.*, Ramezani, Knight and Spyker *et al.*, alone or in combination, do not teach or suggest each and every limitation of applicant's claimed invention. Ramezani fails to make up for the deficiencies of Breslau *et al.*, Knight and Spyker *et al.* as discussed *supra* with regards to the similar limitations recited in independent claim 1. The cited art discloses a system for installing programs on writeable storage device in a fault tolerable manner. Ramezani is silent regarding *a specialized executable image generated at least in part from the operating environment data, the operating environment data includes at least a set of information to create a specialized executable image according to the particular user* as recited in independent claim 33. In view of the foregoing, reversal of this rejection is respectfully requested.

**X. Conclusion**

The subject application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP197US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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/Himanshu S. Amin/

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